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EXAMINER
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MOORTHY, ARAVIND K

ART UNIT	PAPER NUMBER
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2431

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09/18/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/519,157	<b>Applicant(s)</b> CHRISTENSEN ET AL.	
	<b>Examiner</b> ARAVIND K. MOORTHY	<b>Art Unit</b> 2431	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This is in response to the communications filed on 14 April 2009.
2. Claims 1-20 are pending in the application.
3. Claims 1-20 have been rejected.

#### ***Information Disclosure Statement***

4. The examiner has considered the information disclosure statement (IDS) filed on 12/21/2004, 7/25/2005 and 4/14/2009.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 6, 7, 9-11 and 16-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Kwok et al U.S. Patent No. 6,535,924 B1 (hereinafter Kwok).

As to claim 1, Kwok discloses an electronic system, comprising:

a plurality of function cards (i.e. each router has 3 types of cards) [column 5, lines 32-36], each having at least one programmable device residing thereon (i.e. each card has a memory for receiving and storing its runtime image) [column 7, lines 35-37]; and

a configuration control card coupled to each one of the plurality of function cards (i.e. control cards 203) [column 5, lines 63-67]; wherein the

Art Unit: 2431

configuration control card configures the at least one programmable device residing on each one of the plurality of function cards (i.e. each card has a memory for receiving and storing its runtime image) [column 7, lines 35-37].

As to claim 2, Kwok discloses the apparatus, and further comprising:

a memory subsystem residing on the configuration control card (i.e. each card has a memory for receiving and storing its runtime image) [column 7, lines 35-37];

wherein the configuration control card configures the at least one programmable device residing on each one of the plurality of function cards using configuration information stored in the memory subsystem (i.e. each card has a memory for receiving and storing its runtime image) [column 7, lines 35-37].

As to claim 3, Kwok discloses the electronic system, wherein the configuration control card further comprises:

a main controller coupled to the memory subsystem and the plurality of function cards (i.e. Each card within router 200 has an onboard processor. Each card also has a queue system and a plurality of ingress/egress ports. Therefore, upgrade procedures to router 200 according to embodiments of the invention may take the form of various configurations. For example, an upgrade procedure may target a single, a number of, or all of the cards within router 200 that are of a same type. In one embodiment, an upgrade procedure may target specific ones of all of the types of cards within router 200. In still another embodiment, an upgrade

Art Unit: 2431

procedure may target all of the cards operational within router 200.) [column 6, lines 16-27];

the main controller configuring each one of the plurality of function cards using the configuration information stored in the memory subsystem. [column 6, lines 16-27]

As to claim 6, Kwok discloses the apparatus, wherein the plurality of function cards further comprises:

a plurality of function cards of a first type (i.e. line cards), the first type of function cards requiring a first set of instructions for configuration thereof (i.e. line cards 212 and 213 are involved in the upgrade process) [column 7, lines 53-60];

a plurality of function cards of a second type (i.e. fabric cards), the second type of function cards requiring a second set of instructions for configuration thereof (i.e. In fabric 202, each UPG designation represents a hop or FC fabric card in a path of distribution. In this example, UPG image for CC-1 took only one hop through fabric 202 from GMCC 305. UPG image for LC-N takes 4 hops through fabric 202. If any UPG images are destined to fabric cards, then each card will write its own image data to onboard flash and forward that data for other cards.) [column 9, lines 59-65];

the first set of instructions stored in a first area of the memory subsystem and the second set of instructions stored in a second area of the memory

Art Unit: 2431

subsystem (i.e. stored in the memories of the line card and fabric card) [column 7, lines 53-60; column 9, lines 59-65];

wherein the configuration control card configures the plurality of function cards of the first type using the first set of instructions stored in the first area of the memory subsystem and the configuration control card configures the plurality of function cards of the second type using the second set of instructions stored in the second area of the memory subsystem (i.e. FTP node 204 has a dedicated Ethernet network connection 206 to GMCC card 208. Network connection 206 in one embodiment of the invention is a high-speed network link capable of over 100 Mbit/sec data transfer rate. In this type of upgrade, one or more cards, in this case, card 208 within router 200, is configured to perform a network boot operation wherein a connection to FTP node 204 is established for the purpose of downloading SW 210 to card 208. This particular method of getting SW 210 to router 200 is not required in order to practice the present invention. In one embodiment, SW 210 may be distributed to card 208 from FTP node 204 via normal Internet path through one of line cards 201. In this case, SW 210 would have to be distributed through fabric 202 to card 208. Using a separate Ethernet connection is simply a convenience. In another embodiment, SW 210 may be flashed in from a PCMCIA card on a network-connected computer. There are many possibilities.) [column 7, lines 10-27].

As to claim 7, Kwok discloses the apparatus, wherein the configuration control card further comprises:

Art Unit: 2431

a main controller coupled to the memory subsystem, the plurality of function cards of the first type (i.e. line cards 212 and 213 are involved in the upgrade process) [column 7, lines 53-60] and the plurality of function cards of the second type (i.e. In fabric 202, each UPG designation represents a hop or FC fabric card in a path of distribution. In this example, UPG image for CC-1 took only one hop through fabric 202 from GMCC 305. UPG image for LC-N takes 4 hops through fabric 202. If any UPG images are destined to fabric cards, then each card will write its own image data to onboard flash and forward that data for other cards.) [column 9, lines 59-65];

the main controller configuring each one of the plurality of function cards of the first type using the first set of instructions stored in the first area of the memory subsystem (i.e. stored in the memories of the line card and fabric card) [column 7, lines 53-60; column 9, lines 59-65]; and

the configuration control card configuring each one of the plurality of function cards of the second type using the second set of instructions stored in the second area of the memory subsystem (i.e. stored in the memories of the line card and fabric card) [column 7, lines 53-60; column 9, lines 59-65].

As to claim 9, Kwok discloses a broadcast router, comprising:

a first router card (i.e. line card) having an input side, an output side and at least one programmable device residing thereon (i.e. each card has a memory for receiving and storing its runtime image) [column 7, lines 35-37];

Art Unit: 2431

a plurality of input cards (i.e. each router has 3 types of cards) [column 5, lines 32-36], each one of the plurality of input cards coupled to the input side of the router card and having at least one programmable device residing thereon (i.e. each card has a memory for receiving and storing its runtime image) [column 7, lines 35-37];

a plurality of output cards, each one of the plurality of output cards coupled to the output side of the router card and having at least one programmable device residing thereon (i.e. line cards 201 have a plurality of ingress/egress ports) [column 8, lines 44-55]; and

a configuration control card (i.e. control cards 203) coupled to the router card, each one of the plurality of input cards and each one of the plurality of output cards, the configuration control card configuring the at least one programmable device residing on the router card, each one of the plurality of input cards and each one of the plurality of output cards (i.e. Control cards have a plurality of ingress/egress ports) [column 8, lines 56-65].

As to claim 10, Kwok discloses the apparatus, and further comprising:

a second router card (i.e. fabric card) having an input side, an output side and at least one programmable device residing thereon (i.e. In fabric 202, each UPG designation represents a hop or FC fabric card in a path of distribution. In this example, UPG image for CC-1 took only one hop through fabric 202 from GMCC 305. UPG image for LC-N takes 4 hops through fabric 202. If any UPG



Art Unit: 2431

images are destined to fabric cards, then each card will write its own image data to onboard flash and forward that data for other cards.) [column 9, lines 59-65];

each one of the plurality of input cards further coupled to the input side of the second router card (i.e. any upgrade requiring reboot to a new version of SW would be performed in one session for an entire shelf of control cards, fabric cards, or line cards. This type of upgrade is termed a router-level upgrade. In one embodiment, it is also possible to perform a router-level upgrade on all of the cards contained in and operational in the router. However, some logic may be applied such as first upgrading all of the control cards, then all of the line cards, and then all of the fabric cards in a single session. The upgrade process in a preferred embodiment is entirely automatic from the point of issuing an upgrade command. The re-boot process is, in preferred embodiments, a timed function wherein the command is executed as part of the runtime image application command structure.) [column 10, lines 44-57];

each one of the plurality of output cards further coupled to the output side of the second router card [column 10, lines 44-57];

the configuration card further configuring the at least one programmable device residing on the second router card [column 10, lines 44-57].

As to claim 11, Kwok discloses the apparatus, and further comprising:

a memory subsystem residing on the configuration control card, the memory subsystem including a first memory area, a second memory area and a third memory area (i.e. In this example, operational data stored on target cards

Art Unit: 2431

(LC-N, CC-1) is copied to designated backups (LC-1, CC-N) before each target card is taken offline for upgrade assuming, the nature of the upgrade requires re-boot in each case. For example, CC-1 contains current runtime configuration data (CFG-X) that is specific to that card. CFG-X contains all of the pertinent data and component identifications of the components under charge of CC-1. One of these variables is the identification of line cards under control of CC-1. Identification of specific fabric cards under control of CC-1 is also a part of CFG-X. CFG-X resides or may reside in flash memory or runtime memory or both in the target card. CFG-X has enough information to allow the backup of CC-1 (CC-N) to function on behalf of CC-1 when it is offline.) [column 9, lines 10-23];

wherein the configuration control card configures the at least one programmable device residing on each one of the plurality of input cards using configuration information stored in the first area of the memory subsystem, configures the at least one programmable device residing on the first router card using configuration information stored in the second area of the memory subsystem, and configures the at least one programmable device residing on each one of the plurality of output cards using configuration information stored in the third area of the memory subsystem (i.e. In LC-1, the current configuration of CFG-Y is received and stored in memory. LC-N (target card) exhibits a dotted version of CFG-Y in order to illustrate the source. Exact assignments of target cards and dedicated backup cards depends on implementation and enterprise rules. GMCC 305 distributes the appropriate SW image to each target card. The

Art Unit: 2431

upgrade software distribution path to both CC and LC type cards is illustrated herein as a plurality of rounded rectangle labeled UPG.) [column 9, lines 40-48].

As to claim 16, Kwok discloses for a broadcast router having at least one card on which one or more configurable devices reside, a method for configuring the broadcast router, comprising:

issuing a first request for configuration, the first request for configuration issued by a first configurable device residing on a first one of the at least one card (i.e. The router 200 has a network connection to FTP node 204 from which it requests and receives the software package. In one embodiment of the invention this connection may be an Internet connection. In other embodiments any data packet network connection WAN or LAN is applicable. FTP node 204 is assumed in this example to be a node maintained on the Internet network or other applicable WAN. User 205 may access the primary control card 208 for the purpose of receiving upgrade status reports, error notifications, and so on. In one embodiment, user 205 may manually intervene in the upgrade process directly to GMCC 208.) [column 6 line 66 to column 7 line 9];

retrieving configuration information from a shared configuration repository (i.e. SW 210 comprises all of the software images and commands required to facilitate upgrade of each type of card within router 200. For example, control cards 203, line cards 201, and fabric cards 202 boot from and operate according to separate images. These images are termed runtime images by the inventor using familiar object-modeling and programming language that is known

Art Unit: 2431

in the art. The images are built specifically for the type of card that will boot and operate from them. Each card has a memory for receiving and storing its runtime image. In one preferred embodiment the memory is flashable.) [column 7, lines 27-39]; and

configuring the requesting configurable device using the configuration information retrieved from the shared configuration repository [column 7, lines 27-39].

As to claim 17, Kwok discloses the method, and further comprising:

issuing a second request for configuration, the second request for configuration issued by a second configurable device residing on a second one of the at least one card (i.e. line cards 201 are illustrated with a plurality of ingress/egress ports 302. In this example there are eight ports per card, however there may be more or fewer without departing from the spirit and scope of the invention. One of the illustrated line cards is labeled LC-1 and will hereinafter at times be referred to by this label. The other illustrated card is labeled LC-N and will hereinafter at times be referred to by this label. LC-1 is designated in this example as a backup line card and is so labeled. LC-N is designated in this example as a target card for upgrade as is so labeled. The protocol of 1-N is used to indicate that there may be essentially any number of line cards.) [column 8, lines 44-55];

retrieving the configuration information from the shared configuration repository (i.e. Each illustrated card in this example has a flashable memory for

Art Unit: 2431

storing software images. LC-N has a flash memory 306 provided therein and LC-1 has a flash memory 307 provided therein. Similarly, CC-N and CC-1 have flash memories 303 and 301 installed respectively. Each flash memory is capable of storing at least 2 complete software images. It is important to note that an existing SW image is not overwritten or erased during the upgrade process. An image table (not shown) is provided within each flash memory of each card. The table contains the image name and current state of each image on a card.) [column 8 line 66 to column 9 line 9]; and

configuring the second requesting configurable device using the configuration information retrieved from the shared configuration repository [column 8 line 66 to column 9 line 9];

wherein the same configuration information is used to configure the first and second requesting configurable devices [column 8 line 66 to column 9 line 9].

As to claim 18, Kwok discloses the method, wherein the broadcast router includes at least one card of a first type and at least one card of a second type, each one of the at least one card of the first and second types having at least one configurable device residing thereon, and further comprising:

storing a first set of instructions in a first area of the shared configuration repository (i.e. Identification of specific fabric cards under control of CC-1 is also a part of CFG-X. CFG-X resides or may reside in flash memory or runtime memory or both in the target card. CFG-X has enough information to allow the

Art Unit: 2431

backup of CC-1 (CC-N) to function on behalf of CC-1 when it is offline.)  
[column 9, lines 9-23];

storing a second set of instructions in a second area of the shared configuration repository (i.e. The upgrade procedure of the present invention provides for designating backup cards to handle the duties of targeted cards while the targeted cards are being upgraded. Within the illustrated group of line cards 201 in router 200, there are two line cards represented by a dotted border and given the element numbers 212 and 213 respectively. For the purpose of discussion, one of these cards can be designated as a backup card while the other is designated as a target card for upgrade. Within the illustrated group of control cards 203 in router 200, there are three control cards represented by a dotted border and given element numbers 208, 209, and 211 respectively. For the purpose of discussion, one of these cards, card 208 in this example, is designated as a global master control card (GMCC). Control card 209 may be a target card for upgrade, and control card 211 may be a designated backup card.) [column 6, lines 27-43];

retrieving the first set of instructions if the requesting configurable device resides on the at least one card of the first type [column 9, lines 9-23];

retrieving the second set of instructions if the requesting configurable device resides on the at least one card of the second type [column 6, lines 27-43],

if the requesting configurable device resides on the at least one card of the first type, configuring the requesting configurable device using the first set of

Art Unit: 2431

instructions retrieved from the first area of the shared configuration repository [column 9, lines 9-23]; and

if the requesting configurable device resides on the at least one card of the second type, configuring the requesting configurable device using the second set of instructions retrieved from the second area of the shared configuration repository [column 6, lines 27-43].

As to claim 19, Kwok discloses the method, wherein the broadcast router further comprises a configuration control card on which a main controller and the shared configuration repository reside, and further comprising:

the main controller detecting the first request for configuration issued by the first one of the one or more configurable devices residing on the first one of the at least one card (i.e. The router 200 has a network connection to FTP node 204 from which it requests and receives the software package. In one embodiment of the invention this connection may be an Internet connection. In other embodiments any data packet network connection WAN or LAN is applicable. FTP node 204 is assumed in this example to be a node maintained on the Internet network or other applicable WAN. User 205 may access the primary control card 208 for the purpose of receiving upgrade status reports, error notifications, and so on. In one embodiment, user 205 may manually intervene in the upgrade process directly to GMCC 208.) [column 6 line 66 to column 7 line 9];

the main controller initiating a configuration algorithm upon expiration of a time period subsequent to the detected first request for configuration, the time

Art Unit: 2431

period allowing additional ones of the one or more configurable devices to request configuration before the configuration algorithm is initiated (i.e. At step 402, an upgrade command is executed. This step includes manual execution such as by user input, or automated and timed execution such as is the case of a pre-configured network boot. In a pre-configured network boot, a designated GMCC card analogous to card 305 described with reference to FIG. 3 above would, at a pre-designated time, establish a link to a remote image source such as an FTP server. This step is illustrated herein as step 403.) [column 10 line 66 to column 11 line 6].

As to claim 20, Kwok discloses the method, wherein the configuration algorithm further comprises:

selecting a first configurable device residing on one of the at least one cards of the broadcast router (i.e. Identification of specific fabric cards under control of CC-1 is also a part of CFG-X. CFG-X resides or may reside in flash memory or runtime memory or both in the target card. CFG-X has enough information to allow the backup of CC-1 (CC-N) to function on behalf of CC-1 when it is offline.) [column 9, lines 9-23];

querying the selected configurable device as to whether it desires configuration (i.e. Once a complete image is loaded onto a target card, that card is ready to reboot if necessary to begin using the new image. At step 409, it is determined if there are other elements in the schedule to upgrade. If so, another



Art Unit: 2431

element or group of elements is backed up and upgraded. If not, control proceeds to step 410 and the upgrade is complete.) [column 11 line 66 to column 12 line 4];

if the selected configurable device indicates that it desires configuration, propagating configuration information to the selected configurable device (i.e. The upgrade procedure of the present invention provides for designating backup cards to handle the duties of targeted cards while the targeted cards are being upgraded. Within the illustrated group of line cards 201 in router 200, there are two line cards represented by a dotted border and given the element numbers 212 and 213 respectively. For the purpose of discussion, one of these cards can be designated as a backup card while the other is designated as a target card for upgrade. Within the illustrated group of control cards 203 in router 200, there are three control cards represented by a dotted border and given element numbers 208, 209, and 211 respectively. For the purpose of discussion, one of these cards, card 208 in this example, is designated as a global master control card (GMCC). Control card 209 may be a target card for upgrade, and control card 211 may be a designated backup card.) [column 6, lines 27-43];

selecting a next configurable device residing on one of the at least one cards of the broadcast router [column 6, lines 27-43]; and

repeating the querying, propagating and selecting steps until all of the one or more configurable device have been queried [column 11 line 66 to column 12 line 4].

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwok et al U.S. Patent No. 6,535,924 B1 (hereinafter Kwok) as applied to claim 1 above, and further in view of Giovannoni et al U.S. Patent No. 5,659,684 (hereinafter Giovannoni).

As to claim 4, Kwok does not teach that each one of the at least one programmable device residing on each one of the plurality of function cards is a field programmable gate array ("FPGA").

Giovannoni teaches a FPGA located on a card [column 10, lines 57-65].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok so that each one of the at least one programmable device that resided on each one of the plurality of function cards would have been a field programmable gate array ("FPGA").

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok by the teaching of Giovannoni because it requires a low gate count FPGA can be used because only one encoder-decoder process needs to reside in the FPGA at any one time [column 10 line 66 to column 11 line 4].

Art Unit: 2431

As to claim 12, Kwok does not teach that each one of the programmable devices residing on each one of the plurality of input cards, the first router card, and each one plurality of output cards is a field programmable gate array ("FPGA").

Giovannoni teaches a FPGA located on a card [column 10, lines 57-65].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok so that each one of the programmable devices resided on each one of the plurality of input cards, the first router card, and each one plurality of output cards would have been a field programmable gate array ("FPGA").

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok by the teaching of Giovannoni because it requires a low gate count FPGA can be used because only one encoder-decoder process needs to reside in the FPGA at any one time [column 10 line 66 to column 11 line 4].

As to claim 13, Kwok discloses that the configuration control card further comprises:

a memory subsystem, the memory subsystem including a first memory area, a second memory area and a third memory area [as discussed above];

a main controller coupled to the memory subsystem, each one of the plurality of input cards, the first router card, and the plurality of output cards [as discussed above];

Kwok does not teach that the main controller configuring the at least one FPGA of each one of the plurality of input cards using a first set of instructions stored in the first area of the memory subsystem, configuring the at least one FPGA of the first router card using a second set of instructions stored in the second area of the memory subsystem and configuring the at least

Art Unit: 2431

one FPGA of each one of the plurality of output cards using a third set of instructions stored in the third area of the memory subsystem.

Giovannoni teaches a FPGA located on a card [column 10, lines 57-65].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok so that the main controller would have been configured the at least one FPGA of each one of the plurality of input cards using a first set of instructions stored in the first area of the memory subsystem, configured the at least one FPGA of the first router card using a second set of instructions stored in the second area of the memory subsystem and configured the at least one FPGA of each one of the plurality of output cards using a third set of instructions stored in the third area of the memory subsystem.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok by the teaching of Giovannoni because it requires a low gate count FPGA can be used because only one encoder-decoder process needs to reside in the FPGA at any one time [column 10 line 66 to column 11 line 4].

As to claim 14, Kwok discloses the, and further comprising:

each one of the plurality of input cards further coupled to the input side of the second router card [as discussed above]; and

each one of the plurality of output cards further coupled to the output side of the second router card [as discussed above]

Kwok does not teach a second router card having an input side, an output side and at least one FPGA residing thereon. Kwok does not teach the main controller configuring the at least

Art Unit: 2431

one FPGA of the second router card using the second set of instructions stored in the second area of the memory subsystem.

Giovannoni teaches a FPGA located on a card [column 10, lines 57-65].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok so that a second router card would have had an input side, an output side and at least one FPGA residing thereon. The main controller would have been configured the at least one FPGA of the second router card using the second set of instructions stored in the second area of the memory subsystem.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok by the teaching of Giovannoni because it requires a low gate count FPGA can be used because only one encoder-decoder process needs to reside in the FPGA at any one time [column 10 line 66 to column 11 line 4].

7. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwok et al U.S. Patent No. 6,535,924 B1 (hereinafter Kwok) as applied to claim 1 above, and further in view of Dunnihoo U.S. Patent No. 6,185,641 B1.

As to claim 5, Kwok does not teach a peripheral controller residing on each one of the plurality of function cards. Kwok does not teach that each one of the peripheral controllers attending to: (1) forwarding requests for configuration, originated by the programmable device residing with the peripheral controller on one of the function cards, to the main controller; and (2) attending to forwarding configuration information, provided by the main controller to the programmable device residing with the peripheral controller on one of the function cards.

Art Unit: 2431

Dunniho teaches the use of peripheral controllers and the advantages of using such a device [column 5 line 61 to column 6 line 11].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok so that a peripheral controller would have resided on each one of the plurality of function cards. The peripheral controllers would have attended to: (1) forwarding requests for configuration, originated by the programmable device residing with the peripheral controller on one of the function cards, to the main controller; and (2) attending to forwarding configuration information, provided by the main controller to the programmable device residing with the peripheral controller on one of the function cards.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok by the teaching of Dunniho because it is highly advantageous in comparison to prior art USB peripheral controllers because of its highly efficient use of a packet RAM in the MMU. In particular, in the inventive USB peripheral microcontroller, capacity in the packet buffer RAM is dynamically allocatable between packets from multiple USB endpoints and packets from USB host. This is far more efficient than the prior art which utilizes a dedicated FIFO for each USB endpoint [column 4 line 64 to column 5 line 5].

As to claim 8, Kwok does not teach a peripheral controller residing on each one of the plurality of function cards. Kwok does not teach that each one of the peripheral controllers attending to forwarding requests for configuration, originated by the programmable device residing with the peripheral controller on one of the function cards, to the main controller; and each one of the peripheral controller further attending to forwarding configuration information,

Art Unit: 2431

provided by the main controller to the programmable device residing with the peripheral controller on one of the function cards.

Dunniho teaches the use of peripheral controllers and the advantages of using such a device [column 5 line 61 to column 6 line 11].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok so that a peripheral controller would have resided on each one of the plurality of function cards. The peripheral controllers would have attended to: (1) forwarding requests for configuration, originated by the programmable device residing with the peripheral controller on one of the function cards, to the main controller; and (2) attending to forwarding configuration information, provided by the main controller to the programmable device residing with the peripheral controller on one of the function cards.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kwok by the teaching of Dunniho because it is highly advantageous in comparison to prior art USB peripheral controllers because of its highly efficient use of a packet RAM in the MMU. In particular, in the inventive USB peripheral microcontroller, capacity in the packet buffer RAM is dynamically allocatable between packets from multiple USB endpoints and packets from USB host. This is far more efficient than the prior art which utilizes a dedicated FIFO for each USB endpoint [column 4 line 64 to column 5 line 5].

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kwok et al U.S. Patent No. 6,535,924 B1 (hereinafter Kwok) and Giovannoni et al U.S. Patent No. 5,659,684

Art Unit: 2431

(hereinafter Giovannoni) as applied to claim 14 above, and further in view of Bailis et al US 2003/0110306 A1 (hereinafter Bailis).

As to claim 15, the Kwok-Biovannoni combination does not teach a peripheral controller residing on each one of the plurality of input cards, the first and second router cards and each one of the plurality of output router cards. The Kwok-Biovannoni combination does not teach that each one of the peripheral controllers attending to forwarding requests for configuration, originated by the FPGA presiding with the peripheral controller on one of the plurality of input cards, the first router card, the second router cards or one of the output cards, to the main controller. The Kwok-Biovannoni combination does not teach that each one of the peripheral controller further attending to forwarding configuration information, provided by the main controller, to the FPGA residing with the peripheral controller on one of the input cards, the first router card, the second router card or one of the output cards.

Bailis teaches a FPGA cell that is coupled to a peripheral controller [0025].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified the Kwok-Biovannoni combination so that a peripheral controller would have resided on each one of the plurality of input cards, the first and second router cards and each one of the plurality of output router cards. Each one of the peripheral controllers would have attended to forwarding requests for configuration, originated by the FPGA presiding with the peripheral controller on one of the plurality of input cards, the first router card, the second router cards or one of the output cards, to the main controller. Each one of the peripheral controller further would have attended to forwarding configuration



Art Unit: 2431

information, provided by the main controller, to the FPGA residing with the peripheral controller on one of the input cards, the first router card, the second router card or one of the output cards.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified the Kwok-Biovannoni combination by the teaching of Bailis because by coupling the FPGA cell with a peripheral controller the FPGA cell can then be configured to selectively enable the plurality of peripheral functions [0015].

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ARAVIND K. MOORTHY whose telephone number is (571)272-3793. The examiner can normally be reached on Monday-Friday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William R. Korzuch can be reached on 571-272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/519,157

Page 25

Art Unit: 2431

/Aravind K Moorthy/

Examiner, Art Unit 2431